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Review Article

Asian Society of Gynecologic Oncology International Workshop 2018

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ABSTRACT

The Asian Society of Gynecologic Oncology International Workshop 2018 on gynecologic oncology was held in the Ajou University Hospital, Suwon, Korea on the 24th to 25th August 2018. The workshop was an opportunity for Asian doctors to discuss the latest findings of gynecologic cancer, including cervical, ovarian, and endometrial cancers, as well as the future of fertility-sparing treatments, minimally invasive/radical/debulking surgery, radiotherapy, chemotherapy, targeted therapy, and immunotherapy. Clinical guidelines and position statement of Asian countries were presented by experts. Asian clinical trials for gynecologic cancers were reviewed and experts emphasized the point that original Asian study is beneficial for Asian patients. In Junior session, young gynecologic oncologists presented their latest research on gynecologic cancers.

Keywords: Uterine Cervical Neoplasms; Ovarian Neoplasms; Endometrial Neoplasms; Radiotherapy; Antineoplastic Agents; Immunotherapy

INTRODUCTION

The Asian Society of Gynecologic Oncology International Workshop 2018 on gynecologic oncology was held in the Ajou University Hospital, Suwon, Korea on the 24th to 25th August 2018. The workshop was an opportunity for Asian doctors to improve their knowledge of gynecologic cancers and allow all participants to discuss the latest findings of gynecologic cancer, including cervical, ovarian, and endometrial cancers, as well as the future of minimally invasive/radical/debulking surgery, radiotherapy (RT), hyperthermic intraperitoneal chemotherapy (HIPEC), chemotherapy, targeted therapy, and immunotherapy. Professor Hee-Sug Ryu (President of ASGO) addressed a special warm welcome to ASGO members and Professor Ikuo Konishi (Immediate Past President of ASGO) and Young-Tak Kim (President of KSGO) gave congratulatory addresses (**Fig. 1**). Two hundred and fifty-seven participants from 15 countries and areas (Bangladesh, China, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, Mongolia, Myanmar, Philippines, Singapore, Taiwan, Thailand, and USA) attended the workshop, which comprised 42 presentations in 10 sessions [1]. Seung-Cheol Kim (Chairman, Organizing Committee of ASGO International Workshop) made closing remarks and expressed gratitude to all participants (**Fig. 2**).

Fig. 1. Welcome and congratulatory addresses. From left to right, Hee-Sug Ryu (President of ASGO), Ajou University School of Medicine, Republic of Korea; Ikuo Konishi (Immediate Past President of ASGO), National Hospital Organization Kyoto Medical Center, Japan; Young-Tak Kim (President of KSGO), Asan Medical Center, Republic of Korea.

Fig. 2. Banquet and closing ceremony. Closing remarks by Seung-Cheol Kim (Chairman, Organizing Committee of ASGO International Workshop), Ewha Womans University Cancer Center for Women, Republic of Korea.

Author Contributions

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SESSION A-1. CERVICAL CANCER

1. Effectiveness of national HPV vaccination program for Japanese young women

In April 2013, both the bivalent and quadrivalent human papilloma virus (HPV) vaccines were included in the Japanese National Immunization Program. However, only two months later, in June 2013, the Japanese Ministry of Health, Labor, and Welfare suspended proactive recommendations for the HPV vaccine after unconfirmed reports of adverse events. The Niigata study showed a high vaccine effectiveness of the bivalent vaccine against vaccine-targeted high risk-HPV types (i.e., HPV 16 and 18) and significant cross-protection against pooled high risk-HPV types 31, 45 and 52, which are associated with an additional 10% of invasive cervical cancer in Japan [2]. Recently, the Cochrane Library review into the effectiveness and safety of the HPV vaccine demonstrated that the vaccine causes no serious side effects [3]. Takayuki Enomoto concluded that the bivalent vaccines may be able to prevent approximately 82% of invasive cervical cancer in Japan and are safe with no serious adverse effects (**Supplementary Fig. 1**).

2. All about trachelectomy

Radical trachelectomy is an option for cervical cancer stage IA2 or IB1 patients wishing to preserve fertility, but typically only for tumors 2 cm or less. Some studies have examined abdominal radical trachelectomy in patients with larger stage IB1 tumors ranging from 2 to 4 cm in diameter and reported safe oncologic outcomes [4-6]. However, obstetric results

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after abdominal radical trachelectomy were not favorable because more patients in this group may require adjuvant therapy, reducing fertility. Thus, Jin Li suggested that neoadjuvant chemotherapy (NACT) can be used in patients with tumors 2 to 4 cm to reduce tumor size so that a less radical fertility-sparing surgery may be offered [7]. Cervical stenosis is a major and unique complications following radical trachelectomy. The incidence rates of cervical stenosis ranged from 0% to 73.3% with an average rate of 10.5% [8]. It affects not only the quality of life but also obstetrical outcomes. Jin Li concluded that both the cerclage and the placement of an anti-stenosis tool can be used to prevent cervical stenosis, but the effectiveness of these tools needs further studies (**Supplementary Fig. 1**).

3. Revisiting Sedlis criteria: can we do better?

Sedlis criteria have been used for decades in the treatment of early-stage cervical cancer patients with intermediate-risk factors to improve recurrence-free interval. However, the GOTIC study suggested that RT and concurrent chemoradiation therapy (CCRT) after radical hysterectomy (RH) were not beneficial in patients with intermediate risk factors. In particular, RT and CCRT appeared to increase the incidence of lymphedema [9]. In addition, systemic chemotherapy alone without RT, showed similar outcomes as compared to RT, thus may be an alternative treatment choice for adjuvant therapy in intermediate-risk stage IB cervical cancer [10]. Kenneth H. Kim suggested that there should continue to be active research in this arena, and so perhaps it is time to revisit our criteria for when to treat early-stage cervical cancer patients and how to do so effectively (**Supplementary Fig. 1**).

4. Is minimally invasive surgery (MIS) the real culprit in poor prognosis of early-stage cervical cancer?

RH using MIS in early cervical cancer has been adopted in the developed countries as the standard surgical approach. However, the phase III Laparoscopic Approach to Cervical Cancer trial revealed that women undergoing MIS RH for early cervical cancer had higher rates of disease recurrence and worse survival than those who received abdominal RH [11]. Tae-Wook Kong suggested several important factors affecting disease recurrence after MIS RH. Three possible factors are circulating CO_2 pneumoperitoneum, selection of optimal surgical candidates without parametrial invasion, and surgical technique including colpotomic approach (**Supplementary Fig. 1**). In particular, both tumor cut-through and spillage under CO_2 pneumoperitoneum during laparoscopic intracorporeal colpotomy may contribute to tumor recurrence in a port site or unusual intraperitoneal sites [12]. He concluded that MIS RH should be performed more cautiously in optimal surgical candidates to obtain en bloc resection without positive margin and tumor cut-through and spillage, using vaginal colpotomy after CO_2 evacuation.

5. Nodal staging surgery in locally advanced cervical cancer (LACC)

Nodal metastasis is among the most important prognostic factors for survival in patients with LACC. The true-positive and false-negative rate of para-aortic lymph node (PALN) metastasis in positron emission tomography (PET)/computed tomography (CT) is approximately 78% and 12%, respectively. Seung-Hyuk Shim suggested that nodal-staging surgery needs to be individualized in these patients, considering potential morbidity and the cost of staging surgery (**Supplementary Fig. 1**). He developed the risk stratification model using tumor size on magnetic resonance imaging (MRI) and PALN on PET/CT, and a large number of patients can be excluded from surgical staging safely [13]. The event-free survival rates at 3 years for patients with pathologically PALN metastasis measuring ≤5 mm and patients without PALN involvement were similar (69% vs. 74%), suggesting that laparoscopic

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PALN staging surgery in LACC before CCRT is highly efficient in such patients [14]. However, the effect on survival of potential delay of CCRT owing to use of PALN staging surgery, and complications of surgery followed by CCRT need to be studied.

SESSION A-2. EPITHELIAL OVARIAN CANCER

1. Endometriosis-associated ovarian cancer and associated comorbidity

In the analysis of Taiwanese women and meta-analysis, endometriosis was strongly associated with the increased risk of ovarian cancer, especially endometrioid-associated epithelial ovarian cancer (EA-EOC) [15,16]. Furthermore, a bioinformatics platform of function-based, data-driven analysis of the molecular functionome to dissect the molecular pathway of EA-EOC found that the inflammatory/immune response, oxidative stress, and hormone activity play the key roles in the malignant transformation of EA-EOC, suggesting that endometriosis shares molecular signatures with EA-EOC. The Taiwan domestic research addressing associations between endometriosis and other disease suggests that women with endometriosis might be at a higher risk of several chronic diseases, including diabetes mellitus, cardiovascular disease, chronic liver disease, and rheumatoid arthritis, as well as fertility and pelvic inflammatory diseases [17]. However, the results of the endometriosis-associated comorbidity were not always consistent. Peng-Hui Wang suggested that more research is needed to determine whether women with endometriosis are really at a risk of these comorbidities (**Supplementary Fig. 2**).

2. Venous thromboembolism in ovarian cancer patients at Siriraj Hospital

Malignancy has been described as a risk factor for venous thromboembolism (VTE). The prevalence of perioperative asymptomatic proximal deep vein thrombosis (DVT) in Thai patients was 7% [18]. All patients who developed DVT had adenocarcinoma of ovary or uterus [18]. In addition, the 5-year incidence of VTE in 993 ovarian cancer patients was 4.63% at Siriraj Hospital. In particular, VTE complicated by symptomatic pulmonary embolism have been identified to have a negative impact on survival. Suwanit Therasakvichya emphasized the importance of the patient's education, especially leg exercise, and proper assessment of VTE throughout the clinical course of ovarian cancer (**Supplementary Fig. 2**).

3. Drug repositioning strategy for ovarian cancer

Epidemiological study showed that antidyslipidemic statin agents is associated with reduced cancer-related mortality [19]. However, their efficacy for ovarian cancer has been unclear. The effects of statins on tumor cell growth were evaluated in ovarian cancer cell lines, using microarray analysis, metabolomics analysis, and statin administration in transgenic mice and xenograft model mice [20,21]. Yusuke Kobayashi suggested that statins may induce programmed cell death, interfere with the Warburg effect, and cause a shift to activation of the TCA cycle to exert the antitumor effects (**Supplementary Fig. 2**). Thus, drug repositioning strategy by statin may be applied in the clinical side in the future.

4. Role of poly (ADP-ribose) polymerase (PARP) inhibitors in ovarian cancer patients

PARP inhibitors are an exciting new treatment option for patients with ovarian cancer. In platinum-sensitive ovarian cancer patients showing complete or partial response after platinum-based therapy, NOVA, SOLO2, and ARIEL3 trials demonstrated significant improvements progression-free survival (PFS) with PARP inhibitors as maintenance

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treatment [22-24]. Overall survival (OS) results are still pending and are awaited with interest. Although limited data are available regarding long-term safety, only 10%–15% of patients discontinued therapy in all three phase III trials, with manageable treatment-related adverse events. In addition, all 3 Food and Drug Administration (FDA)-approved PARP inhibitors (olaparib, niraparib, and rucaparib) have demonstrated efficacy irrespective of *BRCA* or homologous recombination deficiency (HRD) status. Maria Lee suggested that further studies are required to help select patients for PARP inhibitor as maintenance after the first line chemotherapy when physicians do not have the information about platinum sensitivity, select the next drug strategies for patients with ovarian cancer who progress after PARP inhibitor, and find the best assessment method of response (**Supplementary Fig. 2**).

5. *BRCA1/2* mutation-related ovarian cancer in China

BRCA1/2 genes are cancer predisposition genes, which are related to hereditary breast-ovarian cancer. Previous studies showed that germ-line *BRCA* mutations were found in 14.1% in non-mucinous ovarian cancer patients and more often in high grade serous carcinoma with approximately 22%–25% [25,26]. It is well-known that *BRCA* mutation status influences the survival of patients with ovarian cancer and contribute to decision making and chemotherapy selection in the recurrence settings. However, there are no data of *BRCA1/2* mutations among Chinese ovarian cancer patients. Tingyan Shi reported that *BRCA1/2* mutations were common in Chinese epithelial ovarian cancer patients (16.7%) with distinct mutational spectrum compared to Western populations [27], but she did not find any significant difference between germ-line *BRCA1/2* mutation carriers and non-carriers in both PFS and OS [28] (**Supplementary Fig. 2**).

SPECIAL SESSION 1. PLATINUM-SENSITIVE RECURRENT OVARIAN CANCER: CURRENT PRACTICE AND FUTURE OUTLOOK

Shin-Wha Lee reviewed bevacizumab use in platinum-sensitive recurrent ovarian cancer (**Supplementary Fig. 3**). Gynecologic Oncology Group (GOG) 213 was designed to investigate if OS can be extended in patients with platinum-sensitive, recurrent ovarian, primary peritoneal and fallopian tube cancer by the addition of bevacizumab to standard chemotherapy in 2nd line and maintenance and secondary cytoreductive surgery prior to 2nd line treatment [29,30]. Bevacizumab demonstrated significant survival increase (OS, 5.3 months; PFS, 3.6 months), reducing the risk of death by 18% and the risk of disease progression by 39% [29]. However, secondary cytoreductive surgery was not associated an improvement in either OS and PFS with no surgery in this population. In addition, Shin-Wha Lee suggested future direction as a combination therapy that can increase the effectiveness of the immunotherapy that is emerging recently.

SESSION A-3. GUIDELINES & POSITION STATEMENT

1. Essence and future direction on guidelines and position statement development in Asia

Cancer treatment guidelines are compiled on the basis of established evidence. However, there was still very little evidence from Asian countries that is required for the compilation of

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treatment guidelines. In the third session, clinical guidelines and position statement of Asian countries were presented by experts. The speakers were asked to answer the below questions.

- Do you have any guidelines on gynecologic malignancies in your country?
- What is the decision-making process of treatment for gynecologic malignancies?
- Do you have any different treatment modalities from recommendation of the National Comprehensive Cancer Network (NCCN) Guidelines.
- What do you think of building the Asian guideline on gynecologic malignancies?

Mikio Mikami pointed that it is necessary to efficiently incorporate evidence that has been obtained in Western countries, and furthermore, the guidelines should be adjusted or modified to match the circumstances of the Asian region (**Supplementary Fig. 4**).

2. A3-02. The current situation of the guidelines on gynecological cancers in Japan

The Japan Society of Gynecologic Oncology (JSGO) Guidelines for the treatment of gynecologic malignancies have been revised every 3 to 5 years and became available for all malignant gynecological tumors in Japan [31-34]. The Guidelines were prepared through consensus of the JSGO Guideline Committee, based on careful review of evidence gathered through the literature searches and in view of the medical health insurance system and actual clinical practice situations in Japan. Accordingly, some recommendations differ for Western guidelines such as the NCCN guidelines. For example, RH is widely performed in Japan for cases of stage IIB cervical cancer and, like CCRT, is recommended for such cases. For ovarian cancer, some anticancer agents used in the United States are not available or not covered through health insurance in Japan. For endometrial cancer, recommendations for postoperative adjuvant therapy are quite different from the NCCN guidelines and chemotherapy rather than RT is recommended as postoperative adjuvant therapy in Japan. Finally, Satoru Nagase pointed that evidence needs to be gathered through clinical studies targeting Japanese patients and verification of guidelines is needed (**Supplementary Fig. 4**).

3. A3-03. Korean guidelines & position statement

In 2006, the Korean Society of Gynecologic Oncology (KSGO) established a guideline committee and subsequently published the Gynecologic Cancer Treatment Guidelines 2006 (version 1), and the guidelines has been updated in 2010 (version 2). The Guidelines Revision Committee was established in 2015. Based on the key process including selection of key question, systematic review of publication, making evidence table, and grade of recommendation, the 3rd edition of the KSGO Guidelines for the treatment of gynecologic malignancies were published in 2017 and 2018 [35-37]. In addition, preventive vaccination against cervical cancer and position statement on the genetic test for peritoneal, ovarian, and fallopian tubal cancers of KSGO were published in 2016 [38,39]. Myong Cheol Lim concluded that collaborative clinical trials and sharing of big data focusing on the clinical variables are needed to make the best evidence in Asia (**Supplementary Fig. 4**).

4. A3-04. The position statement of gynecological cancer guidelines in China

The Gynecological Oncology Branch of Chinese Medical Association and Gynecological Oncology Professional Committee of Chinese Anticancer Association have established the Chinese Guidelines for the treatment of gynecologic malignancies. The Guideline were prepared based on careful review of international guidelines and evidence through literature searches and in view of the actual clinical situations in China. Thus, some recommendations differ for NCCN guidelines. For endometrial cancer, they follow the two-type model: type I

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includes endometrioid carcinoma grade 1–2 and mucinous carcinoma, while type II includes endometrioid carcinoma grade 3 and other special pathological types. As for the fertility-sparing therapy for endometrial cancer, the indications in China adds 2 more criteria than NCCN guidelines: age ≤40 and progestin receptor positive. In addition, Jianliu Wang presented several different indications and treatment modalities from recommendation of the NCCN Guidelines. Therefore, it may be necessary to share the evidence of different indications and treatment options from NCCN guidelines in China (**Supplementary Fig. 4**).

5. A3-05. Thailand guidelines & position statement

In Thailand, guideline in gynecologic cancer treatment has been launched since 2005. These guidelines are evidence-based, according to the American and European guidelines, as well as Thailand's own context and experiences. The guidelines have been updated continuously. Along with using the guidelines in treating gynecologic cancer patients, Thai clinicians do several clinical researches to collect their own data and outcome of treatment. Sarikapan Wilailak concluded that the outcome of treatment of gynecologic cancer patients in Thailand is comparable with other western countries (**Supplementary Fig. 4**). In the near future, they are looking forward to international collaboration in terms of researches, sharing technologies and experiences or developing consensus guidelines.

SPECIAL SESSION 2. THREE-DIMENSIONAL (3D) LAPAROSCOPIC SURGERY IN GYNECOLOGIC CANCER

The largest challenge for laparoscopic surgeons is the eye-hand coordination within a 3D scene observed on a 2D display. Clinical trial on operative outcomes in radical prostatectomy showed that 3D laparoscopy significantly reduces the mean total operating time, the mean anastomosis time, and the mean number of anastomosis stitches used [40]. However, both postoperative complications and long-term results were not mature and further study is necessary. With regard to surgeon's self-satisfaction, 81.8% of the subjects found that 3D laparoscopy improved their performance, and 87.9% of participants preferred 3D visualization, but headache, nausea, and eye strain from 3D laparoscopy have been reported [41,42]. Sang Wun Kim anticipated that 3D laparoscopy will enhance the skills of a surgeon and shorten the learning curve of a novice surgeon, ultimately shortening the surgical time and reducing cost and morbidity of the patient (**Supplementary Fig. 3**). However, the physics of 3D, principles of depth perception, and the different kinds of 3D systems will be discussed.

SESSION A-4. CHEMOTHERAPY/TARGET AGENTS AND BEYOND

1. Current standard of chemotherapy in ovary cancer

Recently, anti-angiogenic agents have been shown the promising efficacy as new primary therapies. Both GOG 218 and ICON7 trials met primary endpoint of improved PFS in patients with ovarian cancer [43,44]. In particular, bevacizumab did not increase OS in the study population as a whole, but an OS benefit was noted in poor-prognosis patients including all stage IV, unoperated or suboptimally debulked (>1 cm) stage III [45]. Thus, the synergistic effect of bevacizumab with chemotherapy has been demonstrated in the GOG 218, ICON7, OCEANS, and AURELIA trials [43,44,46,47]. In 2013, the Japanese Gynecologic Oncology Group (JGOG) reported JGOG 3016 demonstrating significant improvements

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in PFS and OS with the dose dense paclitaxel combined with 3-weekly carboplatin over the standard 3-weekly administration of both drugs [48]. However, four randomized studies have shown no benefit of dose dense paclitaxel in terms of PFS (GOG 262, MITO-7, GOG 252, ICON8) [49-52]. Thus, it would appear that 3-weekly administration of paclitaxel and carboplatin remains the standard care for women with advanced ovarian cancer. However, Sook-Hee Hong questioned concerning the timing and duration of bevacizumab treatment and synergistic effect of additional bevacizumab as first line therapy (**Supplementary Fig. 5**). Also, she pointed that the recent trend of chemotherapy is to perform maintenance chemotherapy with low side effects. Three PARP inhibitor trials demonstrated significant improvements PFS with PARP inhibitors as maintenance treatment [22-24]. However, the appropriate selection of patients who will benefit these new drugs and management of toxicity in long-term treatments will be important issues. Bevacizumab has immune modulatory effect by promoting of T cell priming and activation by dendritic cell maturation [53,54]. She also presented that generating a higher tail of survival curve by the increment of long-term survivor with immuno-oncology drugs could be an important issue in the future.

2. Targeting DNA-damage repair deficiency

The homologous recombination (HR) DNA repair pathway mediated by proteins *BRCA1/2* is required for the repair of DNA double-strand breaks arising from DNA-damaging chemotherapeutic agents (e.g. platinum salts), as well as DNA single-strand breaks that are generated by PARP inhibitors [55-60]. Thus, PARP inhibitors have now been approved for use in patients with recurrent *BRCA1/2* mutant and platinum sensitive ovarian, peritoneal, and fallopian tube carcinomas. Likewise, mismatch repair deficiencies in endometrial cancer are associated with durable responses following treatment with the PD-1 inhibitor pembrolizumab [61]. In addition, newer DNA repair targeting agents like ATR/ATM and WEE-1 inhibitors are currently in clinical development [62]. David SP Tan showed clear evidence for the efficacy of DNA damage response targeting in gynecological cancers including platinum-based chemotherapy, PARP inhibitors, immunotherapy (MSI-H), and WEE1 inhibitors and concluded that translational studies are important to understand reasons for success and failure (**Supplementary Fig. 5**).

3. Immunotherapy in gynecologic oncology: what next?

With introduction of immune checkpoint inhibitors, immunotherapy is now becoming one of the standard treatments for several malignancies including melanoma, lung cancers, and renal cancers. Hamanishi et al. [63] have shown that cancer immune microenvironment play an important role in clinical outcome and expression of PD-L1 in ovarian cancer is associated with poor prognosis of the patients. Twenty patients with platinum-resistant ovarian cancer were treated with an intravenous infusion of nivolumab and 2 patients showed complete response, and these patients are still alive, showing that, in some cases, immune checkpoint inhibition can cure heavily treated recurrent ovarian cancer patients [64]. In addition, several chemotherapeutic agents can immunogenicity in ovarian cancer, and thus combination of chemotherapy and immunotherapy may be theoretically effective. Masaki Mandai concluded that cancer immunotherapy is still in introductory stage, and we should optimize many factors to make it effective modality (**Supplementary Fig. 5**).

4. HIPEC for ovarian cancer: investigational vs. standard of care

Malignant peritoneal surface malignancy can lead to significant debility due to bowel obstructions, ascites, and cancer cachexia. Intraperitoneal chemotherapy enhances drug delivery at the peritoneal surface and may improve survival outcomes. In addition,

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hyperthermia can show the synergistic effects with some chemotherapeutic agents by promoting the penetration of chemotherapy at the peritoneal surface and increasing the sensitivity of the cancer cells to chemotherapy. The addition of HIPEC to interval cytoreductive surgery improved survival outcomes among patients who were receiving NACT for stage III epithelial ovarian cancer [65]. The median recurrence-free survival was 3.5 months longer in the group that received cytoreductive surgery with HIPEC than in the group that underwent surgery alone (14.2 vs. 10.7 months). The percentage of patients who had adverse events (grade 3 or 4) was similar in the two groups (25% in the surgery alone group and 27% in the surgery plus HIPEC group, p=0.76). In addition, randomized trial of HIPEC in women with primary advanced peritoneal, ovarian, and tubal cancer were presented at 2017 ASCO meeting [66]. The survival analysis did not show the statistical superiority of the HIPEC arm. After 20 months in PFS and 30 months in OS, however, survival curves in women who received NACT showed the trend of gradual distinction, favoring HIPEC group. Thus, more follow-up is required to confirm the impact of HIPEC on long-term survival outcome in ovarian cancer, especially in NACT group. Suk-Joon Chang concluded that HIPEC can be a viable additional treatment option for patients with advanced ovarian cancer and patients at interval debulking surgery (IDS) after NACT are optimal candidates for HIPEC (**Supplementary Fig. 5**). However, more researches are needed to elucidate the role of HIPEC in ovarian cancer.

5. Therapeutic stratification based on gene expression subtypes in ovarian cancer

High grade serous carcinoma has been shown to exhibit diverse molecular heterogeneity based on gene expression profiling by the Australian and the TCGA cohorts [55,67]. At least 5 distinct gene-expression based molecular subtypes (GEMS) of OC have been identified [68]. In particular, the C1/Mesenchymal/Mes and C5/Proliferative/Stem-A GEMS is associated with poorer survival outcomes and high Epithelial-Mesenchymal Transition (EMT) scores; while the C3/Differentiated/Epi-A, C4/Differentiated/Epi-B, and C2/Immunoreactive/Epi-B show good prognosis and are associated with low EMT scores [69]. Recently, using molecular assessment of subtype heterogeneity (MASH) on 3,431 ovarian cancer samples, correlation and association analyses with survival, metastasis, and clinical outcomes were performed to assess the impact of subtype composition as a surrogate for intra-tumor heterogeneity [70]. The presence of poor prognostic subtypes (Mes or Stem-A) had a significant impact on clinical outcomes. In addition, paired analysis of primary and recurrent/metastatic tumors demonstrated Mes and/or Stem-A subtypes predominated in recurrent/metastatic tumors regardless of the original primary subtype. Ruby Yun-Ju Huang concluded that application of the MASH scheme in deciphering intra-tumor heterogeneity offers a promising tool to inform personalized treatment strategies (**Supplementary Fig. 5**).

SESSION A-5. CLINICAL TRIALS IN ASIA

1. Cervical cancer clinical trials in Asia

Kimio Ushijima reviewed Asian clinical trials for cervical cancer and emphasized the point that original Asian study is beneficial for Asian patients (**Supplementary Fig. 6**). Two clinical trials in low-risk early-stage cervical cancer (<2 cm in tumor diameter) are currently underway to evaluate the efficacy of simple hysterectomy (KGOG 1033, Simple Hysterectomy and Pelvic Node Dissection in Patients With Low-Risk Early Stage Cervical Cancer) or modified RH (JCOG 1101) and pelvic lymph node (LN) dissection. The results of these clinical will

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change the standard treatment in low-risk early-stage cervical cancer. Three clinical trials are ongoing to evaluate the efficacy of adjuvant therapy for intermediate- or high-risk cervical cancer. The GOG 263 (KGOG 1008) aimed to determine if adjuvant chemoradiation can improve recurrence-free survival, compared to RT alone, in International Federation of Gynecology and Obstetrics (FIGO) stage I–IIA cervical cancer patients with intermediate-risk factors. The RTOG 0724 (KGOG 1023) is a phase 3 randomized study of concurrent chemoradiation (weekly cisplatin) with or without adjuvant chemotherapy (4 cycles of carboplatin and paclitaxel given in the extended adjuvant setting) in early-stage cervical cancer with high-risk pathologic features following RH. The JCOG 1402 is a non-randomized confirmatory trial of postoperative concurrent chemoradiation using intensity modulated RT for patients with high-risk uterine cervical cancer. Kimio Ushijima commented that quality assurance of irradiation equipment and cooperation by radio-oncologist and gynecologic oncologist is essential in these clinical trials. In stage IVB or recurrent cervical cancer, a randomized controlled trial has been initiated to compare dose-dense paclitaxel plus carboplatin with or without bevacizumab to a tri-weekly paclitaxel plus carboplatin with or without bevacizumab (JCOG 1311).

2. Ovarian cancer clinical trials in Asia

Jung-Yun Lee gave information about current or past clinical trials for ovarian cancer in Asia (**Supplementary Fig. 6**). Among the completed studies, Shanghai Gynecologic Oncology Group Additional Intraperitoneal Cisplatin and Etopside chemotherapy for Ovarian Cancer Study showed that additional intraperitoneal chemotherapy to standard intravenous chemotherapy is associated with a higher 12-month non-progression rate and a lengthened time to second subsequent anticancer therapy compared with intravenous chemotherapy alone [71]. In the front-line setting of early-stage ovarian cancer, JCOG 1203 is a non-randomized confirmatory study regarding selection of fertility-sparing surgery for stage IA clear cell histology and stage IC unilateral non-clear cell histology grade 1/grade 2 followed by 4 (stage IA clear cell histology) to 6 (stage IC1, IC2) cycles of adjuvant chemotherapy with paclitaxel and carboplatin. The KGOG study (OV 1610) is aimed to compare surgical and survival outcomes between laparoscopic/robotic and open staging surgery in early stage epithelial ovarian cancer. In advanced stage ovarian cancer, there are four ongoing clinical trials. In the front-line setting of advanced-stage ovarian cancer, Asian Gynecologic Oncology Group (AGOG) 11-003/TGOG3008 is a phase II clinical trial that evaluate the efficacy and safety of additional bevacizumab to dose-dense chemotherapy after IDS. The GOTIC 001/JGOG 3019 was designed to prove superiority of intraperitoneal carboplatin over intravenous administration, combined with dose-dense paclitaxel, in stage II–IV ovarian, tubal, and peritoneal cancer. The JGOG 3022 trial is the first large-scale prospective observational evaluating the safety and efficacy of bevacizumab combined with paclitaxel and carboplatin for newly diagnosed stage III/IV epithelial ovarian/fallopian tube/primary peritoneal cancer. Combining bevacizumab with chemotherapy seems to reduce platinum-resistant recurrence (median platinum-free interval, 11.5 months; platinum-resistant recurrence rate, 24.5%) and is promising for clear cell carcinoma (response rate, 63.6%) [72]. The Asia SUNNY Study (SGOG 4B, KGOG 3029) is a randomized phase III study comparing the outcomes between primary debulking surgery and NACT followed by IDS in stage III/IV ovarian, tubal, and peritoneal cancer. In the setting of recurrent ovarian cancer, JGOG 3023 is an open-label, randomized, phase II trial evaluating the efficacy and safety of standard of care with or without bevacizumab in platinum-resistant epithelial ovarian, fallopian tube, or primary peritoneal cancer patients previously treated with bevacizumab for front-line or platinum-sensitive ovarian cancer. It is anticipated that patients treated with a combination of single-

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agent chemotherapy and bevacizumab will show improved PFS compared with those treated with single-agent chemotherapy alone, in the setting beyond disease progression following prior bevacizumab treatment. KGOG 3044 is a phase II trial to evaluate the synergistic effects of bortezomib and liposomal doxorubicin in patients with *BRCA* wild-type platinum-resistant recurrent ovarian cancer. KGOG 3045 is an umbrella study of biomarker-driven targeted therapy in patients with platinum-resistant recurrent ovarian cancer, assessing efficacy of targeted therapy (durvalumab and tremelimumab) according to the status of HRD and PD-L1. Jung-Yun Lee concluded that there have been no improvements in patients with mucinous and clear cell carcinoma subtypes for last 20 years and clinical trials with novel treatment strategies are urgently required to improve clinical outcomes in these cases.

3. Endometrial cancer clinical trials in Asia

Xiaojun Chen pointed out the small proportion of Asian clinical trials compared to Europe, America, and Australia studies (**Supplementary Fig. 6**). When it comes to Asia, only 5 clinical trials are intervened with biotherapy, 6 trials are treated with chemotherapy/radiotherapy, seven are treated by operation, and seven are conducted with fertility-preserving therapy. For targeted therapy, a Chinese team and a Japanese team are investigating on the use and effectiveness of CAR T-cell therapy (CAR-modified T-cells against mesothelin expressing cancer, NCT02580747) and MORAb-202 (antibody-drug conjugate utilizing humanized anti-human FRα farletuzumab and the Microtubule-targeting agent eribulin, NCT03386942). With regard to chemotherapy and RT, a Chinese team is investigating on the efficacy of postoperative adjuvant chemotherapy (paclitaxel plus carboplatin) and RT for high-risk stage I endometrial cancer patients (NCT01820858); 2 clinical trials from Korea are studying on the efficacy of chemotherapy for advanced or recurrent endometrial cancer (docetaxel plus cisplatin, NCT01461759), and chemotherapy (docetaxel plus cisplatin) followed by RT in surgically treated women with stage II/III endometrioid and stage IB/II clear cell/serous carcinoma patients (NCT01461746). Four Chinese teams are studying on the effectiveness of levonorgestrel-releasing intrauterine system (LNG-IUS), metformin, and other treatment modalities as fertility-sparing treatment in early-stage endometrial cancer (LNG-IUS plus metformin, NCT02990728; LNG-IUS, NCT03463252; megestrol acetate, NCT03241914; and megestrol acetate plus metformin, NCT01968317). The current situation of endometrial cancer clinical trials in not optimistic. However, the need for multi-center, international investigator-driven clinical trials has grown stronger as there are many questions in endometrial cancer needed to be answered, such as the treatment standard for rare types of uterine tumors, adjuvant treatment of intermediate-high risk endometrial cancer, more detailed fertility-preserving treatment guidelines, the use of sentinel LN for high-risk endometrial cancer, and clinical application of molecular classification of endometrial cancer.

4. Clinical trials in Asia/AGOG perspective

Although there have been several multicenter trial groups in North America and Europe, there was no such groups in Asia. Thus, it was felt that international collaboration of Asian countries is necessary and AGOG was born in 2005 in Taiwan. Kazunori Ochiai showed that race and ethnicity might have an impact on treatment outcome and survival in gynecologic cancer, especially in ovarian cancer (**Supplementary Fig. 6**). In GOG 218 study, clinically significant differences in the hazard ratio occurred in women of Asian descent when compared to other racial groups [73]. Fuh et al. [74] also showed that Asians epithelial ovarian cancer patients showed prolonged survival compared to Caucasians and Asians present at a younger age, have better performance status, have earlier-stage of disease at enrollment, and have more clear cell and mucinous tumors. In addition, pazopanib maintenance therapy showed a disadvantage

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in OS in East Asian patients from AGO-OVAR16 versus placebo (hazard ratio=1.706; 95% confidence interval=1.010–2.883; p=0.0465) [75]. However, the reason for survival disparities remain unclear. Kazunori Ochiai concluded that the survival difference in Asian women may be important in the design of future clinical trials and AGOG will collaborate with other Asian groups to collect Asian data through clinical trial setting.

5. How to promote collaboration in Asia?

Taek Sang Lee mentioned that Asia is rising as a preferred destination for clinical trials, due to the following attractive traits (**Supplementary Fig. 6**). First, Asian countries have plenty of resources and capability in conducting clinical trials. In detail, Asia has large treatment-naïve patients for speedy recruitment in urban area. Second, collected data in Asia are acceptable worldwide. The percentage of official actions taken in FDA inspections was lower in Asia than North America, reflecting high quality of international compliance. Third, government spending on healthcare in one patient in Asian countries is lower than in the US and Western Europe, which create opportunity for clinical trials to be an effective way for Asian patients to get access to innovative therapies. Fourth, disease pattern is very similar to that of Western countries, providing a comparable environment to conduct clinical trials. Fifth, high quality infrastructures including mobile and internet penetration and rising adoption of electronic health records will make clinical trials faster and more efficient. Last, Asia offers lower costs for clinical trials. He appealed that we need to overcome a few challenges relating to complexities, infrastructure and legal issues, and language and cultural hurdles for more efficient collaboration.

SESSION A-6. JUNIOR SESSION

1. Effect of megestrol acetate combined with metformin versus megestrol acetate in women undergoing conservative therapy for atypical hyperplasia or endometrial cancer

Bingyi Yang and colleagues evaluated therapeutic effects associated with megestrol acetate combined with metformin versus megestrol acetate in women with endometrial atypical hyperplasia and early endometrial cancer in Fudan University Hospital (**Supplementary Fig. 7**). Patients received high-dose progestin combined with hysteroscopy and were randomized to receive metformin or not. Metformin plus megestrol acetate may be a potential alternative therapy, especially for patients overweight or with insulin resistance. However, due to limited cases, the results are not statistically significant. More clinical researches are needed to further investigate.

2. Intraoperative consultation (frozen section) in the diagnosis of ovarian masses

Farhana Kalam and colleagues in Bangabandhu Sheikh Mujib Medical University reported validity of intraoperative frozen section in the diagnosis of ovarian masses (**Supplementary Fig. 7**). The sensitivity of frozen section in the diagnosis of benign, borderline, and malignant tumors were 100%, 100%, and 96.67% respectively as well as the specificities were 100%, 97.96%, and 100% respectively. Intraoperative consultation of ovarian masses is accurate and provide guidance for the clinician regarding surgical management. However, diagnostic problem can occur in borderline tumors during frozen section examination.

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3. A20-mediated deubiquitination of ERα in the microenvironment of CD163+ macrophages sensitizes endometrial cancer cells to estrogen

Utilizing flow cytometry, immunohistochemistry staining, endometrial microarray, and biology approach, Qiaoying Lv and colleagues in Fudan University Hospital evaluated the regulation of the ubiquitin-editing enzyme A20 on ERα stability and estrogen sensitivity in the microenvironment of endometrial lesions with CD163+ macrophages (**Supplementary Fig. 7**). They found that A20-mediated deubiquitination of ERα might be an important mechanism by which CD163+ macrophages increase estrogen sensitivity in endometrium. This study highlights the significant role of A20 in inducing estrogen-dependent endometrial cancer, implying that A20 might be a potential target for therapeutic intervention.

4. A 5-year retrospective review on metabolic syndrome and endometrial carcinoma: a tertiary center experience

Mohd Faizal Ahmad and colleagues evaluated the link between metabolic syndrome and its constituent factors to endometrial carcinoma among patients in Universiti Kegangsaan Malaysia Medical Centre (**Supplementary Fig. 7**). There were 102 cases of endometrioid carcinoma (type 1 tumors) and serous (n=7), clear cell (n=3) and carcinosarcoma (n=7) were the type II tumors. Metabolic syndrome was significantly associated with increased risk of endometrial carcinoma in type I tumors. Obesity increased the risk of type I endometrial carcinoma. Thus, effective prevention of these metabolic disorders might be essential in reducing the incidence of endometrial carcinoma.

5. Management of endometrial cancer in Adam Malik Hospital Medan, North Sumatra, Indonesia

Muhammad Rizki Yaznil presented a report on management of endometrial cancer in Haji Adam Malik Hospital (**Supplementary Fig. 7**). Most of the patients had endometrial cancer stage IA (20/74, 27%). Of the 74 patients, 25 patients (33.8%) received surgery only, 25 patients (33.8%) had surgery and adjuvant radiotherapy. Only 4 cases (6%) from 67 surgically treated patients underwent laparoscopic approach.

6. Analysis of the predictive role of LN density, negative LN, and log odds of positive lymph nodes (LODDS) on the survival of cervical cancer patients

LN density is defined as the ratio of the number of metastatic LNs and the total number of LN s removed, negative LN is the ratio of negative LNs to the harvested LNs, and log odds of positive lymph nodes (LODDS) is log odds between positive LNs and negative LNs. LN density >15%, negative LN >25, and LODDS are associated with an impaired disease-free and OS. Therefore, Batra K et al. concluded that LND may be used as an independent prognostic parameter in patients with LN positive cervical cancer (**Supplementary Fig. 7**).

7. Prevalence of anal intraepithelial neoplasia (AIN) in women with cervical intraepithelial neoplasia (CIN)

Manatsawee Manopunya and colleagues evaluated the prevalence of AIN in women with CIN and the performance of liquid-based anal cytology (LBAC) and high-resolution anoscopy (HRA) for AIN screening (**Supplementary Fig. 7**). LBAC had 33.3% sensitivity and 94.9% specificity with 33.3% positive predictive value and 94.9% negative predictive value; HRA has 100% sensitivity and 74.4% specificity with 23.1% positive predictive value and 100% negative predictive value. Women with CIN have 7.1% prevalence of AIN. Screening for AIN with LBAC alone in women with CIN has poor sensitivity. These women may benefit from HRA to screen for AIN.

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SPECIAL SESSION 3. HPV VACCINE UPDATE

Dae Hoon Jeong gave a presentation on the long-term effectiveness data of Gardasil and Cervarix (**Supplementary Fig. 3**). Three highlights were summarized as described previously [76]. First, do not use 9-valent HPV vaccine as a booster vaccine for those already vaccinated because the revaccinated girls had significantly lower anti-HPV31/33/45/52/58 titers than among the girls receiving 9-valent HPV vaccine de novo [77]. Cost-effective analysis also indicated that 9-valent HPV vaccine should not be used to revaccinate those already vaccinated with three doses of Gardasil [78]. Second, both 9-valent HPV vaccine and 2-valent HPV vaccine are equivalent in efficacy against CIN2+ regardless of HPV type; 2-valent HPV vaccine also has demonstrated sustained high antibody titers for at least 10 years [79]. Third, HPV vaccines reduced the number of abnormal screening tests, colposcopies, and excisional biopsies [76]. In addition, He presented the evidence of the safety and protective benefits of HPV vaccine, based on the resource-stratified, evidence-based recommendations on the primary prevention of cervical cancer provide by the American Society of Clinical Oncology [80]. The current evidence supports the recommendation for a 2-dose schedule with adequate spacing between the first and second dose (minimum 6-month interval) in those aged 9–14 years. Individuals older than ≥15 years and older and HIV infected immunocompromised should receive a 3-dose schedule (0, 1–2, 6 months). Safety data for all three HPV vaccines are reassuring by many organization or agency. More than 270 million doses of HPV vaccine have been distributed since 2006, but there are no severe adverse effects linked to vaccination. Thus, obstetrician-gynecologists and other health care providers should counsel patients to expect discomfort after vaccination and that such discomfort is not a cause for concern.

SESSION A-7. ENDOMETRIAL CANCER

1. Current standard of care and debating points in endometrial cancer

Upfront surgery and adjuvant therapy tailoring to the pathologic findings remain the mainstay of primary staging and treatment in endometrial cancer. Surgical staging generally consists of simple hysterectomy with bilateral salpingo-oophorectomy (BSO) and lymphadenectomy, preferably via MIS. Arb-aroon Lertkhachonsuk presented debating points evolved around those steps with conflicting results in the literature as follows (**Supplementary Fig. 8**). First, ovarian preservation; BSO used to be recommended to detect occult metastases and reduce the hormone level. However, recent studies revealed that ovaries could be preserved in selected cases and ovarian preservation did not associate with adverse impact on outcomes [81,82]. Thus, all guidelines recommend ovarian preservation in early-stage endometrial cancer (premenopause, superficial myometrial invasion, grade 1). Second, lymphadenectomy in early-stage disease; pelvic and para-aortic lymphadenectomy used to be recommended for diagnostic and therapeutic purposes, with the increased risk of complication. The Cochrane Library review found that lymphadenectomy do not decrease risk of death or disease recurrence compared with no lymphadenectomy in presumed stage I disease [83]. Also, there is no evidence that lymphadenectomy has a significant impact on survival in women with higher-stage disease and in those at high risk of disease recurrence [83]. Thus, lymphadenectomy has a diagnostic significance to determine correct surgical stage, but the therapeutic benefits are not established. Third, omental biopsy; microscopic omental metastases were not negligible (1.9%) in patients with clinical stage I endometrial cancer [84]. However, all guidelines recommended that omental biopsy/omentectomy should be considered in serous, clear cell, and carcinosarcoma histology. Fourth, RH in

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suspected cervical involvement; GOTIC study could not find any survival benefit from RH for endometrial cancer patients with suspected gross cervical involvement, while perioperative and late adverse events were more frequent in the RH group [85]. However, all guidelines except from Europe recommended RH in stage II disease. Thus, guidelines from the United States and Europe have undergone through many changes in the last decades, while there are still some controversial issues in the management of endometrial cancer.

2. Imaging update in endometrial cancer

Hyun Hoon Chung presented an update of imaging techniques in endometrial cancer including tumor-volume combined diffusion-weighted imaging or integrated PET/MRI system (**Supplementary Fig. 8**). He suggested MRI and PET/CT for preoperative workup and PET/CT for disease surveillance technique. MRI is an established investigation modality for preoperative local staging in endometrial cancer. In particular, advances in functional MRI with diffusion-weighted imaging and dynamic contrast-enhanced sequences provide more detailed information regarding tumor cellularity, vascularity, and viability [86]. There is no established role for PET/CT in the routine follow-up or surveillance of endometrial cancer. However, PET/CT has an excellent diagnostic performance for detecting LN metastasis preoperatively and disease recurrence postoperatively in endometrial cancer patients [87]. ACRIN 6671/GOG 0233 multicenter trial suggested that PET/CT demonstrates high specificity and positive predictive value for detecting distant metastasis in endometrial cancer and should be included in the staging workup [88]. In addition, ultra-fast PET/MRI provides equivalent diagnostic performance and scan time when compared to PET/CT and superior diagnostic performance to CT in restaging female patients suspected recurrence of pelvic malignancies [89].

3. Sarcoma update

Hidemichi Watari reviewed aspect of updated sarcomas and summarized phase III studies on newer drugs (**Supplementary Fig. 8**). Uterine sarcomas are malignant mesenchymal tumors including endometrial stromal sarcoma (ESS), undifferentiated uterine sarcoma, leiomyosarcoma, and even rare subtypes (adenosarcoma, rhabdomyosarcoma, PEComa). If medically operable, hysterectomy with or without BSO is the initial treatment of choice for uterine sarcoma. BSO is favored for low-grade ESS or tumors expressing estrogen receptor (ER)/progesterone receptor (PR). For medically inoperable sarcomas, pelvic external beam RT with or without brachytherapy and/or systemic therapy is considered. Preferred systemic therapies for uterine sarcoma include doxorubicin, gemcitabline/docetaxel, doxorubicin/olaratumab, and aromatase inhibitor for low-grade ESS [90-92]. For ER/PR positive undifferentiated uterine sarcoma, hormone therapies (megesterol acetate, medroxyprogesterone acetate, aromatase inhibitor, GnRH analogue) can be applied. For recurrent disease, new drugs such as pazopanib, trabectedin, and eribulin have been approved for soft tissue sarcomas including uterine sarcomas [93-95].

4. A7-04. Microsatellite instability (MSI) in endometrial cancer

The function of DNA mismatch repair genes (MMR) is lost in 20%–30% of patients with endometrial cancer, displaying MSI as a consequence of somatic hypermethylation and silencing MLH1 [96,97]. Determination of MMR deficiency in endometrial cancer may be important for assessment of prognosis and adjuvant therapy. MMR deficiency can be detected by either MSI analysis and/or immunohistochemical (IHC) staining, typically four MMR proteins (MLH1, PMS, MSH2, MSH6). Recently, 696 endometrial cancers were analyzed for MSI (pentaplex panel) and MMR protein expression (IHC) [98]. The results of MSI and MMR protein expression were concordant in 655/696 cases (κ=0.854, $p<0.001$), showing that IHC

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approach is sufficient for determining MMR deficiency in endometrial cancer. In addition, primary endometrioid endometrial cancer from NRG/GOG0210 patients were assessed for MSI, MLH1 methylation, and MMR protein expression [99]. MMR deficiency tumors have an increased propensity for having lymphovascular invasion and higher tumor grade, which are adverse prognostic factors. However, the prognosis for patients with MMR defects were not different, suggesting MMR defects may counteract the effects of negative prognostic factors. Recently, data published from the phase Ib KEYNOTE-028 clinical trial that evaluated the activity of the PD-1 directed antibody pembrolizumab in patients with PD-L1-positive advanced or metastatic endometrial cancer [61]. Of the 24 patients with PD-L1 positive advanced endometrial cancer, confirmed partial response were achieved in 3 patients (13.0%) and three additional patients (13.0%) had stable disease. Seob Jeon concluded that MSI-high is a potential biomarker for PD-1 blockade, immune checkpoint blockade holds promise for endometrial cancer with MMR defects and MSI testing may improve classification of endometrial cancer and lead to personalized treatment options (**Supplementary Fig. 8**).

SUPPLEMENTARY MATERIALS

Supplementary Fig. 1

Session A-1 Cervical Cancer. Speakers, first row from left to right, Takayuki Enomoto, Niigata University Graduate School of Medical and Dental Sciences, Japan; Jin Li, Fudan University Shanghai Cancer Center, China; Kenneth H. Kim, University of Alabama at Birmingham, United States; Tae-Wook Kong, Ajou University School of Medicine, Republic of Korea; Seung-Hyuk Shim, Konkuk University School of Medicine, Republic of Korea.

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Supplementary Fig. 2

Session A-2 Epithelial Ovarian Cancer, first row from left to right, Peng-Hui Wang, Taipei Veterans General Hospital, Taiwan; Suwanit Therasakvichya, Mahidol University, Thailand; Yusuke Kobayashi, Keio University School of Medicine, Japan; Maria Lee, Seoul National University College of Medicine, Republic of Korea; Tingyan Shi, Fudan University, China.

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Supplementary Fig. 3

Special Session, from left to right, Shin-Wha Lee, University of Ulsan College of Medicine, Asan Medical Center, Republic of Korea; Sang Wun Kim, Yonsei University College of Medicine, Republic of Korea; Dae Hoon Jeong, Busan Paik Hospital, Republic of Korea.

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Supplementary Fig. 4

Session A-3 Guidelines and Position Statement, first row from left to right, Mikio Mikami, Tokai University, Japan; Satoru Nagase, Yamagata University, Japan; Myong Cheol Lim, National Cancer Center, Republic of Korea; Jianliu Wang, Peking University People's Hospital, China; Sarikapan Wilailak, Mahidol University, Thailand.

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Supplementary Fig. 5

Session A-4 Chemotherapy/Targeted Agents and Beyond, first row from left to right, Sook-Hee Hong, The Catholic University of Korea, Republic of Korea; David SP Tan, National University of Singapore, Singapore; Masaki Mandai, Kyoto University Graduate School of Medicine, Japan; Suk-Joon Chang, Ajou University School of Medicine, Republic of Korea; Ruby Yun-Ju Huang, National University of Singapore, Singapore.

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Supplementary Fig. 6

Session A-5 Clinical Trials in Asia, first row from left to right, Kimio Ushijima, Kurume University School of Medicine, Japan; Jung-Yun Lee, Yonsei University College of Medicine, Republic of Korea; Xiaojun Chen, Hospital of Fudan University, China; Kazunori Ochiai, The Jikei University School of Medicine, Japan; Taek Sang Lee, SMG-SNU Boramae Medical Center, Republic of Korea.

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Supplementary Fig. 7

Session A-6 Junior Session, first row from left to right, Bingyi Yang, Hospital of Fudan University, China; Farhana Kalam, National Institute of Cancer Research and Hospital, Bangladesh; Qiaoying Lv, Hospital of Fudan University, China; Mohd Faizal Ahmad, Universiti Kebangsaan Malaysia Medical Center, Malaysia; Muhammad Rizki Yaznil, H. Adam Malik General Hospital – Universitas Sumatera Utara, Indonesia; Kanika Batra Modi, Max Institute of Cancer Care, Saket, India; Manatsawee Manopunya, Chiang Mai University, Thailand.

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Supplementary Fig. 8

Session A-7 Endometrial Cancer, first row from left to right, Arb-aroon Lertkhachonsuk, Mahidol University, Thailand; Hyun Hoon Chung, Busan Paik Hospital, Republic of Korea; Hidemichi Watari, Hokkaido University Graduate School of Medicine, Japan; Seob Jeon, Soonchunhyang University Cheonan Hospital, Republic of Korea.

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